ORIGINAL RESEARCH

Comparison Between Ultrasound Guided Transrectal versus Freehand Transperineal Ultrasound Guided Prostate Biopsy in a Tertiary Hospital (Philippines): A Randomized Prospective, Cross-Sectional Study

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Introduction: Prostate cancer, a significant male health concern (ASR: 29.3/100,000), demands accurate diagnosis. Prostate biopsy, pivotal for clinical decisions, relies on transrectal biopsy as the norm, despite limitations like infection risk and incomplete sampling. An alternative, transperineal biopsy, grants broader access but demands more time and anesthesia. Escalating complications due to antibiotic resistance heighten apprehensions.

Discrepancies in complications emerge from varied studies, while cancer detection rates stay consistent (45-49%). These conflicting outcomes raise vital safety issues. This study strives to bridge the information void by assessing complications within the local context, offering clarity for informed biopsy choices. With 150 words, the importance of evaluating biopsy methods in light of complications becomes evident, emphasizing the significance of this research in guiding clinical practice.

Objective: This research aims to compare ultrasound guided transrectal prostate biopsy and freehand ultrasound guided transperineal biopsy at a Quezon City government hospital. Specific objectives include describing patient profiles for each technique, assessing infection rates, evaluating pain tolerance, comparing hematuria levels, measuring dysuria immediately post-biopsy and 1 day after, analyzing hospitalization rates, evaluating the techniques' effectiveness in detecting prostate cancer, and reviewing histopathologic differences in prostatitis between the two methods.

Methods: The study was conducted at the Veterans Memorial Medical Center Urology Section from January to October 2023. Using a prospective, descriptive, cross-sectional design, male patients undergoing ultrasound guided transrectal or transperineal prostate biopsies were included. Inclusion criteria include males aged 45 and above with PSA above 4.0 ng/dl and abnormal prostate findings. Exclusion criteria cover repeat biopsy cases and prior prostate cancer diagnosis. With an assumed 50% detection and complication rate, a minimum of 109 patients for each biopsy type was required for a 95% confidence level and 5% margin of error, totaling 218 participants.

Results: The study compared transrectal and transperineal prostate biopsies in terms of patient characteristics, complications, diagnostic accuracy, and cancer detection rates. Patients undergoing transrectal biopsy had higher mean PSA levels (53.41 vs. 28.59, $p = 0.024$) and received more fosfomycin prophylactic antibiotics (27% vs. 18%, $p = 0.044$) compared to transperineal biopsy patients. Complication rates varied significantly between the two techniques, with chronic prostatitis seen in 5% of transperineal cases ($p < 0.01$). Transrectal biopsy patients experienced more pain, gross hematuria, urinary retention, fever, and hospitalization ($p < 0.01$). Diagnostic performance, assessed through the ROC curve's area under the curve, showed comparable sensitivity and specificity for transrectal (AUC = 0.559) and transperineal (AUC = 0.441) biopsies ($p = 0.108$). Cancer detection rates did

not significantly differ between transrectal (34.4%) and transperineal (45.9%) biopsies (p = 0.114). These results provide insights into the differences and similarities between the two biopsy techniques, impacting patient demographics, complications, and diagnostic outcomes.

Conclusion: This comparative investigation of transrectal and transperineal prostate biopsies in a tertiary hospital setting yields impactful insights. Participant ages were similar, but transrectal patients had higher PSA levels. Complication rates varied, with more chronic prostatitis in the transperineal group. Transperineal biopsies reduced pain, while transrectal group faced more complications. Cancer detection rates remained comparable. Transperineal biopsies demonstrated advantages in alleviating discomfort and potentially reducing complications. Tailoring biopsy approach based on patient profiles is crucial for diagnostic efficacy and patient well-being. These findings guide informed decision-making, prioritizing safety and experience in prostate biopsy practices.

Key words: Prostate biopsy, transrectal, transperineal, complications, cancer detection

Introduction

Prostate cancer was the second most prevalent cancer diagnosis in men and the fifth leading cause of death worldwide in 2018 (ASR: 29.3 per 100,000). The Philippines' ASR is 22.6 per 100,000, slightly lower than the global average. Early prostate cancer may be asymptomatic, but late stages may cause urine retention.[1] The best way to an informed decision making is a prostate biopsy.[3,4]

The gold standard for prostate cancer diagnosis is ultrasound-guided transrectal biopsy, which Cooner popularized in 1988 and Stamey and colleagues refined in 1989.[5] This approach inserts a core biopsy device into the rectum after a prophylactic antibiotic.[4] Due to its limited prostate access, this approach may not sample the apical and anterior areas enough, resulting in pathogenic problems.[6] Instead, transperineal biopsy involves core biopsy via the perineum's epidermis without antibiotics.[4,5] Unlike transrectal biopsy[5], this biopsy allows access to the prostate's anterior and apical areas. This operation takes longer than transrectal biopsies and requires nerve block or anesthetic.[3]

Infectious prostate biopsy consequences have increased due to multiresistant bacteria.[7] Transrectal biopsy patients have higher complications.[6] The prospective Webb, Shanmuganathan, and McLean investigation showed that transperineal biopsy can cause problems. The study found hematuria (62%), hemospermia (13%), discomfort (31%), dysuria (0.7%), septicemia (0.7%), and urine retention (7%). In contrast, the Australian Grummet research showed no infective problems or sepsis post-biopsy re-admission.

In response to conflicting findings in individual investigations, comparative studies, systematic reviews, and meta-analyses addressed information gaps. Huang, et al. found that transrectal biopsy patients were more likely than transperineal biopsy patients to have gross hematuria, urine retention, a perineal hematoma, urinary tract infection, fever over 38.5°C, sepsis, and hospitalization for complications.[5] Xiang, et al.'s systematic review and meta-analysis found that transperineal treatment reduced fever and rectal bleeding.[8] Unlike the previously stated research, Miller, Perumalla, and Heap found no statistically significant difference in complication rates between the two procedures. The investigation found sepsis, severe hematuria, rectal hemorrhage, urethral bleeding, hematospermia, and vasovagal events.[4] Young's study found no significant differences in sepsis, hemorrhage, and urinary tract infection between the two groups. Acute urine retention is considerably greater in transperineal biopsy patients.[7] Shen et al.'s systematic study found no significant difference in complications between transrectal and transperineal biopsies.[9]

Comparative studies showed transrectal and transperineal biopsies detect cancer similarly.[5,6] Huang, et al. found 49% cancer detection with transrectal biopsy and 45% with transperineal biopsy (p = 0.4920). Kawakami, et al.[10] found that transperineal biopsies detected malignancy 86% (243/783) and transrectal biopsies 82% (231/783) (p = 0.5100). Systematic reviews and meta-analyses[8,9] showed that both biopsy methods were accurate. Both biopsy methods detected cancer similarly, however the rate of complications

differed. Research shows conflicting outcomes, which could compromise patient safety. Overall, transrectal biopsy increases the likelihood of infective consequences.[6] This has not been recorded locally. Thus, the research notion was created.

This study describes and compares the infection rates, tolerability, hematuria, dysuria (immediate and 1 day post biopsy), hospitalization rate, capacity and histopathologic assessment of ultrasound guided transrectal prostate biopsy and freehand ultrasound guided transperineal biopsy among patients seen in a tertiary training government hospital in Quezon City, Philippines

Methods

Study Site

The study was conducted in the Urology Section of Veterans Memorial Medical Center (VMMC) in Quezon City, Philippines.

Study Duration

The study was carried out from January 2023 to October 2023.

Study Design

The study made use of a prospective cohort, analytical research design by recruiting patients subject for investigation and to gather comprehensive data related to the clinical outcomes of ultrasound guided transrectal prostate biopsy and freehand ultrasound guided transperineal biopsy at the Urology Section of Veterans Memorial Medical Center (VMMC). This data collection focused itself on determining the demographic and clinical profile of patients and other relevant background information of the patients as well as the critical outcomes as basis in determining the performance of the procedure.

Study Population

This study involved male patients as observation units. Specifically, male patients who underwent ultrasound guided transrectal prostate biopsy and transperineal prostate biopsy at the Section of Urology of VMMC were eligible study units. The following inclusion and exclusion criteria were applied.

The inclusion criteria for the study required participants to be 45 years old or older, have a prostate-specific antigen (PSA) level above 4.0 ng/dl, and present with an abnormal prostate on digital rectal examination. Exclusion criteria included individuals undergoing a repeat prostate biopsy, regardless of the indication, and those who had been previously diagnosed with prostate cancer.

Sample Size

Using a conservative approach, sample size estimation was done using StatCalc of Epi Info version 7.2.4. The latest census documented a total of 150 ultrasound guided transrectal prostate biopsy. For the purposes of maximizing the sample size, the anticipated cancer detection rate and complication rate per specific complication was set at 50%. Under a confidence level of 95% and a margin of error of 5%, the minimum number of patient charts included in the study was 109 in order to detect a 50% cancer detection rate and complication rate for transrectal prostate biopsy. Since the implementation of transperineal prostate biopsy was started in 2021, the assumptions used in the sample size estimation for transrectal biopsy was adapted for transperineal biopsy. In total, 218 participants were included in the study, where 109 patients underwent transrectal prostate biopsy and 109 patients underwent transperineal prostate biopsy.

Sample Size for Frequency in a Population

Population size(for finite population correction factor or fpc) (N):	150
Hypothesized % frequency of outcome factor in the population (p):	50%+/-5
Confidence limits as % of 100(absolute +/- %)(d):	5%
Design effect (for cluster surveys-DEFF):	1

Sample Size(n) for Various Confidence Levels

Confidence Level(%)	Sample Size
95%	109
80%	79
90%	97
97%	114
99%	123
99.9%	132

Equation

Sample size $n = [DEFF*Np(1-p)]/ [(d^2/Z^2_{1-\alpha/2}*(N-1)+p*(1-p)]$

Sampling Design

Purposive sampling was used in the recruitment of participants. All eligible participants were invited to participate in the study.

Operational Definition of Study Variables

Prostate-specific antigen (PSA) level refers to the concentration of PSA in the serum, measured in ng/dl. An abnormal digital rectal examination indicates the presence of clinical observations that may suggest or indicate prostate cancer, such as a nodular, non-movable, and hard prostate. Prostate volume refers to the size of the prostate as visualized in an ultrasound. The prophylactic use of antibiotics involves taking any antibiotic within the past seven days. Complications are any adverse events arising from the biopsy, including prostatitis, pain, gross hematuria, urinary retention, urinary tract infection, fever above 38.5°C, sepsis, or hospitalization due to complications. The complication rate is calculated by dividing the number of specific complications by the total number of participants, multiplied by a factor. Cancer detection refers to identifying cancer through biopsy, with the cancer detection rate calculated by dividing the total number of specimens positive for prostate cancer by the total number of participants, multiplied by a factor. Hematuria refers to the presence of blood in the urine, prostatitis is a disorder of the prostate gland associated with inflammation, and dysuria refers to pain upon urination.

Data Collection

Patients who were scheduled either for transrectal or transperineal prostate biopsy were invited to participate in the study. Upon obtaining written informed consent, the patient was enrolled in the study. The investigator interviewed the patient to obtain clinic-demographic details. Within seven days of observation post-biopsy procedure, the patients were observed. All possible complications within this period were evaluated by the investigator to ensure that the event was a complication of the prostate biopsy procedures. Once verified, the complications and cancer detection rates were documented.

Data Management

Gathered data were encoded in Microsoft Excel 2019. Only the investigator and the data manager/biostatistician had access to the data of this study. The data were kept in a password-protected spreadsheet

Data Analysis

STATA version 14 was used in data analysis. Descriptive statistics were employed to estimate the complication rates per event and the cancer detection rates. Frequency distributions were generated for all pertinent variables. The mean ± standard deviation (SD) was estimated for all continuous variables, while percentages were determined for all categorical variables. A test for two proportions (z-test) was applied to determine if there were significant differences between the complication rates per event and the cancer detection rates of the two biopsy procedures.

Ethical Consideration

The study protocol was submitted to the Technical and Ethical Review Board of the institution from whom an exemption for ethics review was sought. No considerable harm was imparted to the respondents. There was no direct human participation in the study, as secondary data were used. The study adhered to the provisions of the Data Privacy Act of 2012. Codes were used to represent each patient to ensure privacy and confidentiality of information. Only the principal investigator had access to the identity of all the participants. Personal identifiers were removed at data entry to ensure the anonymity of the participants to the data encoders. Information deemed confidential, such as that which might emotionally harm or degrade the integrity and dignity of a person, was not shared. The data set was kept for ten years after the conclusion of the study, after which it was deleted permanently

Declaration of Conflict of Interest

The principal investigator declares no conflict of interest.

Dissemination of Findings

Findings of this study were made available to the public and scientific communities through publication in duly recognized journals. Feedbacks were provided to the participants through a forum.

Results

The study compared various parameters between patients undergoing transrectal (n=122) and transperineal (n=133) prostate biopsies. (Table 1). The mean age was slightly higher in the transperineal group (68.73±15.5) compared to the transrectal group (66.27±16.11), though this difference was not statistically significant (p=0.107). PSA levels were significantly higher in the transrectal group (53.41±135.11) than in the transperineal group (28.59±30.68), with a p-value of 0.024. Findings from digital rectal examinations (DRE) showed a similar distribution of positive (7.4% vs. 6.8%) and negative results (92.6% vs. 93.2%) between the two groups, with p-values of 0.425 and 0.423, respectively. The mean prostate volume was comparable between the two groups (51±28.17 for transrectal and 53.37±31.65 for transperineal), with no significant difference (p=0.264). Prophylactic antibiotic use varied between the groups, with Fosfomycin more commonly used in the transrectal group (27% vs. 18%, p=0.044), while Ciprofloxacin was used at similar rates in both groups (73% vs. 74.4%, p=0.391). However, the results should be taken cautiously since this study is a single-center study, generalizing the results to other centers may have limited validity.

In Table 2, the study examined the sequelae following transrectal and transperineal prostate biopsy procedures. Chronic prostatitis was observed in 5% of patients who underwent the transperineal biopsy, while no cases were reported in the transrectal group, resulting in a significant difference (p<0.01). Chronic inflammation and urinary tract infections were not observed in both groups. Pain levels were significantly higher in the transrectal group, with a mean pain score of 3.87±1.45 compared to 3.14±1.16 in the transperineal group (p=0.005). Gross hematuria, urinary retention, fever >38.5°C, and hospitalization due to complications were all reported exclusively in the transrectal group, with each showing statistically significant differences (p<0.01). No such complications were observed in the transperineal group. These findings suggest that the transperineal approach may be associated with fewer complications and lower pain levels compared to the transrectal biopsy method.

Table 1. Clinico-demographic characteristic of patients (N=255)

Parameter	Transrectal (n=122)	Transperineal (n=133)	p-value
Mean (± SD) Age	66.27±16.11	68.73±15.5	0.107
Mean (± SD) PSA level	53.41±135.11	28.59±30.68	0.024
Findings in DRE (No. %)			
Positive	9 (7.4%)	9 (6.8%)	0.425
Negative	113 (92.6%)	124 (93.2%)	0.423
Prostate Volume (No. %)	51±28.17	53.37±31.65	0.264
Positive	45 (36.9%)	58 (43.6%)	0.138
Negative	66 (54.1%)	66 (49.6%)	0.237
Prophylactic antibiotic use (No. %)			
Fosfomycin	33 (27%)	24 (18%)	0.044
Ciprofloxacin	89 (73%)	99 (74.4%)	0.391

Table 2. Complication rate per sequelae of transrectal and transperineal biopsy.

Sequelae	Transrectal	Transperineal	Total	p-value
Chronic prostatitis	0 (0%)	6 (5%)	6 (2%)	<0.01
Chronic inflammation	0 (0%)	0 (0%)	0 (0%)	-
Pain scale	3.87±1.45	3.14±1.16	3.47±1.23	0.005
Gross hematuria	9 (7%)	0 (0%)	9 (4%)	<0.01
Urinary retention	6 (5%)	0 (0%)	6 (2%)	<0.01
Urinary tract infection	0 (0%)	0 (0%)	0 (0%)	-
Fever > 38.5ºC	6 (5%)	0 (0%)	6 (2%)	<0.01
Hospitalization due to complication	6 (5%)	0 (0%)	6 (2%)	<0.01

The study compared pain levels between patients undergoing transrectal and transperineal prostate biopsies. In Table 3, a slightly higher percentage of patients reported no pain in the transperineal group (14%) compared to the transrectal group (12%), though this difference was not statistically significant (p=0.425). Mild pain was significantly more common in the transperineal group (45%) than in the transrectal group (25%), with a p-value of 0.018. Moderate, severe, and very severe pain levels were reported more frequently in the transrectal group (31%, 15%, and 12%, respectively) than in the transperineal group (23%, 11%, and 7%), but these differences were not statistically significant (p=0.161, p=0.299, and p=0.167, respectively). The "worst" pain was only reported in the transrectal group (4%), with no cases in the transperineal group, approaching significance with a p-value of 0.066. These results suggest that while mild pain is more common in transperineal biopsies, higher pain intensities are more associated with transrectal biopsies.

Table 3. Severity of pain.

Pain	Transrectal Prostate Biopsy	Transperineal Prostate Biopsy	p-value
No pain	15 (12%)	18 (14%)	0.425
Mild	31 (25%)	60 (45%)	0.018
Moderate	38 (31%)	30 (23%)	0.161
Severe	18 (15%)	15 (11%)	0.299
Very severe	15 (12%)	9 (7%)	0.167
Worst	5 (4%)	(0%)	0.066

Table 4 analyzed the incidence of dysuria (pain upon urination) following transrectal and transperineal prostate biopsies. A significantly higher percentage of patients in the transperineal group (95%) reported no pain compared to the transrectal group (61%), with a p-value of 0.001. Conversely, mild dysuria was more common in the transrectal group (24%) compared to the transperineal group (5%), with a p-value of 0.002. Additionally, moderate dysuria was reported only in the transrectal group (15%), with no cases in the transperineal group, also showing a significant difference (p=0.002). These findings indicate that dysuria is significantly less common in patients undergoing transperineal prostate biopsies compared to those undergoing transrectal biopsies.

Table 4. Post procedural dysuria.

Dysuria	Transrectal Prostate Biopsy	Transperineal Prostate Biopsy	p-value
No pain	75 (61%)	116 (95%)	0.001
Mild	29 (24%)	6 (5%)	0.002
Moderate	18 (15%)	0 (0%)	0.002

In the first void post-biopsy, most patients in both groups experienced Grade 1 hematuria, with 81% in the transrectal group and 83% in the transperineal group, showing no significant difference (p=0.418). (Table 5) Grade 2 hematuria was reported by 11% of transrectal patients and 9% of transperineal patients (p=0.390). However, Grade 3 hematuria was significantly more frequent

in the transrectal group (6%) compared to the transperineal group, where no cases were observed (p=0.037). Grade 4 hematuria was rare, occurring in 2% of transrectal patients and none in the transperineal group, but the difference was not statistically significant (p=0.123).

At 24 hours post-biopsy, almost all patients in both groups experienced Grade 1 hematuria (98% in the transrectal group and 96% in the transperineal group), with no significant difference (p=0.352). Grade 2 hematuria was reported by 7% of transrectal patients and 6% of transperineal patients (p=0.455). Grade 3 hematuria, though infrequent, was only observed in the transrectal group (4%) and not in the transperineal group, approaching statistical significance (p=0.066).

Table 6 show the Area Under the Curve (AUC) for the two biopsy methods—transperineal and transrectal. For the transperineal biopsy method, the AUC was 0.441 with a standard error of 0.037 and a p-value of 0.108. The 95% confidence interval for this AUC ranged from 0.369 to 0.512, indicating moderate diagnostic performance but not reaching statistical significance. In contrast, the transrectal biopsy method had an AUC of 0.559 with a standard error of 0.037 and a p-value of 0.108. The 95% confidence interval for this AUC ranged from 0.488 to 0.631. This AUC value suggests slightly better diagnostic performance compared to the transperineal method, though it also does not achieve statistical significance. Overall, both methods show AUC values indicating moderate performance, with transrectal biopsy slightly outperforming the transperineal method in terms of diagnostic accuracy, but neither method achieved statistical significance in this analysis.

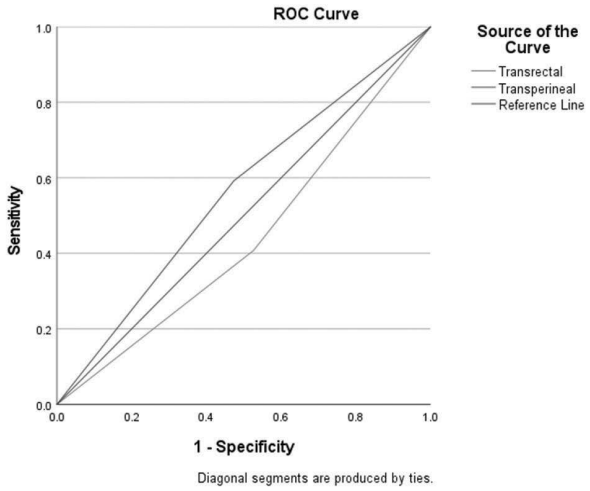

Table 5. Hematuria with first void post biopsy and 24 hours void post biopsy.

Time	Hematuria Grade	Transrectal Prostate Biopsy	Transperineal Prostate Biopsy	p-value
First Void Post Biopsy	1	99 (81%)	110 (83%)	0.418
	2	13 (11%)	12 (9%)	0.390
	3	7 (6%)	(0%)	0.037
	4	3 (2%)	(0%)	0.123
24 hours Void Post Biopsy	1	119 (98%)	128 (96%)	0.352
	2	8 (7%)	8 (6%)	0.455
	3	5 (4%)	(0%)	0.066

Table 6. Diagnostic performance.

Area Under the Curve					
Variables	Area	Std Error	p-value	95% Confidence Interval	
				Lower Bound	Upper Bound
Transperineal	0.441	0.037	0.108	0.369	0.512
Transrectal	0.559	0.037	0.108	0.488	0.631

Table 7. Cancer detection.

	Cancer Detected	%	p-value
Transrectal	42	34.4%	0.031
Transperineal	61	45.9%	

The study compared the rates of cancer detection between transrectal and transperineal prostate biopsy methods. The transrectal biopsy detected cancer in 42 cases, representing 34.4% of the total, with a p-value of 0.031, indicating a statistically significant result. In comparison, the transperineal biopsy detected cancer in 61 cases, or 45.9% of the total. This suggests that the transperineal biopsy method had a higher cancer detection rate than the transrectal method. The p-value for the transrectal biopsy indicates that this difference in detection rates is statistically significant.

In this investigation comparing transrectal and transperineal prostate biopsies within a tertiary hospital setting, several key findings emerged that hold crucial implications for clinical practice. Notably, while participant ages were comparable, the transrectal group exhibited higher PSA levels, hinting at potential differences in disease presentation. The analysis of complication rates unveiled a significant contrast, with chronic prostatitis being notably more prevalent in the transperineal cohort. Importantly, the transperineal approach demonstrated a significant reduction in pain scores, underlining its advantageous position in enhancing patient comfort during the procedure. Conversely, the transrectal group bore a higher burden of complications, including gross hematuria, urinary retention, fever, and hospitalization. Despite these differences, cancer detection rates between the two methods remained similar, reaffirming their diagnostic comparability. The evaluation of dysuria illuminated a clear advantage for the transperineal approach in terms of lower pain during urination, extending to a potential reduction in discomfort 24 hours post-biopsy. The nuances of hematuria outcomes indicated varied results, yet the transperineal technique displayed promise in minimizing higher-grade hematuria occurrences.

This study underscores the critical role of tailoring biopsy approach to individual patient profiles, considering not only diagnostic efficacy but also patient well-being. While both methods yielded similar cancer detection rates, the transperineal pathway emerged as a favorable option due to its ability to alleviate patient discomfort and reduce the risk of specific complications. As the medical landscape continues to evolve, these findings provide valuable insights for informed decision-making, ensuring that patient safety and experience remain at the forefront of clinical practices surrounding prostate biopsies.

Discussion

In terms of demographic and clinical profile, the result shows the mean age of patients was slightly higher in the transperineal group, but this difference was not statistically significant. PSA levels were significantly higher in the transrectal group, while the distribution of positive and negative findings in digital rectal examinations and mean prostate volume were comparable between the two groups.[11-13] Prophylactic antibiotic use varied, with Fosfomycin used more in the transrectal group. Studies in the literature had a slightly higher mean age in the TP group, with the difference being also statistically insignificant. The PSA levels were significantly higher in the TR group in both studies[11,12], highlighting a consistent finding. The distribution of positive and negative findings from digital rectal examinations and mean prostate volume were comparable between the two methods in the study. Both studies reported variability in prophylactic antibiotic use, with Fosfomycin being more common in the TR group.

For Sequelae, chronic prostatitis occurred only in the transperineal group, while no cases were reported in the transrectal group, showing a significant difference. Pain levels were notably higher in the transrectal group, and complications such as gross hematuria, urinary retention, fever >38.5°C, and hospitalization were exclusive to the transrectal group, indicating that the transperineal method was associated with fewer complications and lower pain levels. Comparing with the literature, the study observed chronic prostatitis solely in the TP group which reported similar incidences of chronic

prostatitis and inflammation between the methods. Pain levels were higher in the TR group in the study, aligning with the RRL's finding that TP biopsies were associated with lower overall discomfort. The study's observation of higher rates of gross hematuria, urinary retention, fever, and hospitalization in the TR group supports the RRL's conclusion that TP had fewer complications, including a 0% sepsis rate versus a 2.2% sepsis rate for TR.[11,14]

In terms of pain, pain levels were generally low for both techniques, with TP biopsies reported to have a lower overall discomfort score. The study found that mild pain was more prevalent in the TP group, while moderate, severe, and very severe pain were more common in the TR group. This is consistent with the RRL, which noted that TP biopsies had lower overall pain levels compared to TR, though the latter had higher pain intensity.[11,13] While, in terms of complications, the TP approach had significantly lower rates of urinary tract infections (UTIs), gross hematuria, and hospitalization due to complications compared to the TR method. Specifically, the TP method demonstrated a 0% sepsis rate, while the TR method had a 2.2% sepsis rate which corresponds with the RRL's finding of lower dysuria rates in the TP group and higher rates in the TR group. [12,13] The incidence of dysuria was lower in the TP group while for hematuria with lower rates reported in the TP group compared to the TR group. Compared with the results from the studies in the literature the incidence of dysuria was significantly lower in the TP group in the study. [11,12,13,14]

Both biopsy methods demonstrated moderate diagnostic performance. However, the TR approach had a higher overall cancer detection rate, particularly in patients with prostate volumes between 30–80 mL and T3–T4 stages. The TP method showed advantages in detecting anterior zone cancers and had a higher maximum cancer core length and core involvement percentage. The RR, however, highlighted TR's advantage in detecting cancers in patients with larger prostate volumes and advanced stages, while TP showed benefits in detecting anterior zone cancers and had a higher maximum cancer core length and core involvement percentage. [11,12,14]

The study found a higher cancer detection rate with the TP method (45.9%) compared to TR (34.4%), which was statistically significant. This finding contrasts with the RRL, which noted a higher overall cancer detection rate with TR but acknowledged TP's effectiveness in detecting clinically significant cancers, especially with MRI/TRUS fusion techniques. [11,12,14]

Conclusion

This comparative investigation of transrectal and transperineal prostate biopsies in a tertiary hospital setting yielded impactful insights. Participant ages were similar, but transrectal patients had higher PSA levels. Complication rates varied, with more chronic prostatitis in the transperineal group. Transperineal biopsies reduced pain, while transrectal group faced more complications. Cancer detection rates remained comparable. Transperineal biopsies demonstrated advantages in alleviating discomfort and potentially reducing complications. Tailoring biopsy approach based on patient profiles is crucial for diagnostic efficacy and patient well-being. These findings guide informed decision-making, prioritizing safety and experience in prostate biopsy practices.

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